Mitigation Costs Method Description

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Mitigation Cost Methods for FS

- Cost development for FS alternatives analysis includes costs for potential compensatory mitigation
- Preliminary estimates of Clean Water Act (CWA) Section 404 compensatory mitigation are made using the LWG's mitigation matrix framework
  - Using LWG-derived functional habitat values and National Marine Fisheries Service (NMFS) relative habitat values

Matrix Development

- Matrix uses habitat values to compare existing conditions to proposed conditions (i.e., after remediation) within the same area
  - Functional Habitat Values are based on habitat functions as determined by physical indicators that are impacted by remedial actions
  - Relative Habitat Values are based on “Expert Panel” table of Chinook relative habitat values developed for Natural Resource Damage (NRD) purposes and updated for ESA species
- Difference between proposed and existing values results in either a mitigation credit or debit

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Matrix Values

- Note that the Functional Habitat Values are a form of Relative Habitat Value approach
- The Functional Habitat Value approach accounts for the variability in habitat type using factors such as:
  - Substrate
  - Slope
  - Type and percent of vegetative cover
- This approach could be more detailed at the implementation stage when it can be used to more accurately assess mitigation needs

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Mitigation Determination

- Completed on an SMA level
- Acres of mitigation = [(Proposed Habitat Value – Existing Habitat Value) * Acres of Impact]
  - Functional Habitat mitigation determination acreage given a +/- 30% range for planning purposes
- Resulting acres of mitigation refers to:
  - Functional Habitat Value Approach: Acres of high quality functional habitat (i.e., off-channel, shallow water/active channel margin [ACM] with sand/gravel substrates and shoreline complexity)
  - Relative Habitat Value Approach: Acres of an "ideal" habitat type that is lacking in the system (i.e., similar to above)

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Mitigation Costs

- On-site (i.e., within Portland Harbor) costs of mitigation per acre: $1.0 to $2.0 Million (2010 dollars)

- Based on professional mitigation experience in industrial areas of the Pacific Northwest
- Assumes creation of ACM and shallow water habitat from excavating existing upland; assumes all excavated material is not contaminated

- Includes restoration construction, engineering design work, permitting, project and construction management, long-term monitoring and maintenance (10 years), and contingencies

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Mitigation Costs

- Off-site costs of mitigation per acre: $0.3 to $0.6 million
  - More rural areas outside of Portland Harbor
  - Costs based on professional mitigation experience in non-industrial areas of the Pacific Northwest
  - Assumes creation of ACM and shallow water habitat from excavating in area outside of Portland Harbor

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Mitigation Cost Range

- Cost estimate derived for each Sediment Management Area (SMA) as a range for planning purposes
- Uses the greatest to least total debits for each method~~s~~, and highest and lowest estimated per acre cost of mitigation

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Hypothetical SMA 13 Alternative E Example

Alternative E	
E-r	E-i
Removal of 2.4 to 3.2 million cy over 130 acres; in-situ engineered capping with large rock over 12 acres; disposal in CDFs and upland facilities	Removal of 1.2 to1.6 million cy over 76 acres; in-situ capping with carbon/sand layer mix and large rock (over wave zone) over 80 acres; disposal in CDFs and upland facilities
Hyp. SMA 13 E-r (5.9 acres)	Hyp. SMA 13 E-i (5.9 acres)
Removal of approximately 92,000 cy of material over 5.9 acres	Engineered cap (large rock) over approximately 0.52 acres; in-situ treatment over 5.38 acres

Example: Habitat Determination

SMA 13	Existing acres (predominant substrate)	E-r acres (predominant substrate)	E-i acres (predominant substrate)
ACM	0.17 (riprap)	0.02 (riprap)	0.50 (riprap)
Shallow 0-10	1.42 (silt/sand)	0.32 (sand/gravel)	1.11 (sand/gravel)
Shallow 10-20	1.66 (silt/sand)	1.71 (sand/gravel)	1.65 (sand/gravel)
Deep 20+	2.65 (silt/sand)	3.86 (sand/gravel)	2.64 (sand/gravel)

Mitigation Determination Results

SMA 13	Functional Habitat Approach Result	Functional Habitat Approach +/- 30% Range	Relative Habitat Value Approach Result
E-r	-0.30	-0.21 to -0.39	-0.90
E-i	ND	ND	-0.30

ND = no determination of mitigation

Resulting debit refers to acres of high quality habitat to be created (i.e., Off-channel, ACM, or shallow water habitat with sand/gravel substrates and shoreline complexity)

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Cost Determination Using the Functional Habitat Value Approach

LWG Developed a range of costs based on:

- |Lowest debit| x $300,000 (assumed low mitigation cost per acre)
- |Highest debit| x $2,000,000 (assumed high mitigation cost per acre)

Cost Range for SMA 13 Alternative E-r

0.21 x $300,000 to 0.39 x $2,000,000

$63,000 to $780,000

Cost Range for SMA 13 Alternative E-i

(ND) x $300,000 to (ND) x $2,000,000

$0

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Cost Determination Using the Relative Habitat Value Approach

LWG Developed a range of costs based on:

- |Lowest debit| x $300,000 (assumed low mitigation cost per acre)
- |Highest debit| x $2,000,000 (assumed high mitigation cost per acre)

Cost Range for SMA 13 Alternative E-r

0.90 x $300,000 to 0.90 x $2,000,000

$270,000 to $1,800,000

Cost Range for SMA 13 Alternative E-i

0.30 x $300,000 to 0.30 x $2,000,000

$90,000 to $600,000

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